

WHAT IS CLAIMED IS:

1. A regulator providing a load voltage, comprising:
  - a power driver having a feedback input and a power driver voltage;
  - a comparator having a comparator output related to a combination of the load voltage and a power driver current;
  - a pulse generator controlled by the comparator output and having output pulses with fixed pulse widths; and
  - a time limit circuit controlled by the output pulses, the time limit circuit providing the output pulses to the feedback input subject to a time limit between the output pulses.
2. The regulator of Claim 1 wherein the output pulses are ON pulses.
3. The regulator of Claim 1 wherein the output pulses are OFF pulses.
4. The regulator of Claim 1 wherein the combination is a function of a weighted sum of the load voltage and the power driver current.
5. The regulator of Claim 1 wherein the comparator further comprises a reference circuit and a sensing impedance sensing the power driver current.
6. The regulator of Claim 5 wherein an inductance is coupled between the power driver voltage and the sensing impedance.
7. The regulator of Claim 5 wherein the capacitance comprises a capacitor having an equivalent series impedance that is less than the sensing impedance.
8. The regulator of Claim 1 wherein the comparator circuit comprises a comparator and a voltage divider coupled to the comparator.

9. The regulator of Claim 1 wherein the power driver voltage output has a duty cycle that is controlled by both the load voltage and the power supply input voltage.
10. The regulator of Claim 1 wherein the time limit circuit comprises a first one shot circuit and an AND function coupled to an output of the first one shot circuit.
11. The regulator of Claim 1 wherein the pulse generator comprises a second one shot circuit and an OR function coupled to an output of the second one shot circuit.
12. The regulator of Claim 1 wherein the comparator, the pulse generator and the time limit circuit are formed as an integrated circuit, and the integrated circuit further comprises a synchronous driver logic portion of the power driver.
13. The regulator of Claim 1 further comprising a low pass filter coupled to the power driver output, the low pass filter providing the load voltage.
14. The regulator of Claim 13 wherein the low pass filter comprises an inductance coupled to a capacitance.
15. The regulator of Claim 13 wherein the comparator circuit further comprises a current limit circuit coupled to the power driver output and the load voltage, the current limit circuit having a current limit control output controlling the reference circuit to provide a soft start.
16. A regulator providing a load voltage, comprising:

a power driver having a feedback input and a power driver voltage, a comparator having a comparator output related to a combination of the load voltage and a power driver current, and a pulse generator controlled by the comparator output and providing output pulses with a fixed width; and

means for providing the output pulses to the feedback input subject to a time limit between the output pulses.

17. The regulator of Claim 16 wherein the output pulses are ON pulses.

18. The regulator of Claim 16 wherein the output pulses are OFF pulses.

19. The regulator of Claim 16 wherein the combination is a function of a weighted sum of the load voltage and the power driver current.

20. The regulator of Claim 16 wherein the power driver voltage output has a duty cycle that is controlled as a function of both the load voltage and the power supply input voltage.

21. A method of controlling a regulator, comprising:

providing a comparator output related to a combination of load voltage and power driver current of the regulator;

controlling a pulse generator to provide fixed width output pulses as a function of the comparator output; and

providing a feedback input to the regulator that includes the output pulses subject to a time limit between the output pulses.

22. The method of Claim 21 further comprising controlling a duty cycle of the feedback input as a function of the combination.

23. The method of Claim 21 wherein the comparator output provides a comparison of the combination to a reference.

24. The method of Claim 23 further comprising controlling the reference voltage as a function of the load voltage during a start up time to provide a soft start.

25. The method of Claim 21 and further comprising filtering with a low pass filter to provide a load voltage that is filtered.

26. The method of Claim 25 and further comprising forming the low pass filter with a ceramic capacitor with a low equivalent series resistance.